An Student Driven Multidisciplinary Knowledge Integration Teaching Program

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Abstract *— Traditional engineering curricula always face the challenge of finding a way for the students to integrate , by themselves , the knowledge they learn as completely separate compartments in every class, let alone the integration of the different disciplines of engineering. This work presents an experience that, for the first time in Venezuel a, faces this challenge by translating the full responsibility to manage and complete a multidisciplinary engineering project to a group of students. Based on the international Formula SAE competition and taking advantage of the matrix organization of the Universidad Simon Bolivar, a multidisciplinary group of engineering students from over 10 different majors is organized as a small company, with a well defined decision making structure, and given the responsibility to manage an engineering project from be ginning to end. The students must conceive, design, build, test, develop and put into competence a race car in one year of work. In the technical aspects , they must develop a high -tech vehicle integrating electronics , mechanics, materials, aesthetics, ergo nomics, aerodynamics, and many areas of engineering. This forces the student into a very demanding work -like environment and brings the need for the integration of knowledge and the most needed multidisciplinary interaction. Yet, the success of this progra m lies on the fact that the whole responsibility of its success is translated onto the same students that are learning from it. Besides the technical aspects, the group of students must secure funds by contacting sponsors and negotiating with them, doing t he tie and suit work and meeting with high executives and CEOs. They must also manage the funds, contacting suppliers, generating purchase orders, payments , and an end -of-year financial report; manage human resources and recruitment ; and manage physical re sources available so as to assure the completion of the project by the deadline of the competition. A multidisciplinary team of three professors oversees the work of the group and provides some guidance, yet, according to their needs the students have invo lved over 20 professors and professionals as technical advisors in particular aspects of the design, managing and marketing of the project. Along its three years of work, the program has evolved, by students' initiative, into three elective courses open al ong the year (for the students working in the program), has promoted the creation of four new elective courses on related topics (open to all students), and has produced and financed eight thesis works in three different majors. Overall, the program establ ished shows how translating the responsibility onto the students and providing a good motivation (in this case a race car) can provide an excellent tool for assuring knowledge integration, team work, management experience, and self -confident students, plus a way to obtain funds for investment into quality teaching.*

Index Terms *— Student Driven Learning, Multidisciplinary Work, Formula SAE.*